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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/327,713	06/08/1999	KIMIHIKO NISHIOKA	PM260332	5810

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EXAMINER	
PARKER, KENNETH	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/327,713	NISHIOKA, KIMIHIKO	
	Examiner	Art Unit	
	Kenneth A Parker	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *5/27/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43,45 and 48-83* is/are pending in the application.

4a) Of the above claim(s) *1-36,45,50-56 and 57-76, 79-83* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *37-43,48,49,77 and 78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

The amendment filed 5/19/03 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: (claim 37), the variable optical property mirror" having a reflecting surface that has a shape that defines only one plane of symmetry or no plane of symmetry; (claim 40), the "variable optical property mirror" having a reflecting surface that defines only one plane of symmetry or no plane of symmetry ;(claim 77) The "variable optical property element" having a rotationally asymmetric with only one plane of symmetry or no plane of symmetry. As best understood by the examiner, the specification showed a mirror, or variable used with an optical element that had asymmetric surfaces- but not the mirror or optical element itself.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 37-43, 48-49, 77-78 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

inventor(s), at the time the application was filed, had possession of the claimed invention.

(claim 37), the variable optical property mirror" having a reflecting surface that has a shape that defines only one plane of symmetry or no plane of symmetry; (claim 40), the "variable optical property mirror" having a reflecting surface that defines only one plane of symmetry or no plane of symmetry ;(claim 77) The "variable optical property element" having a rotationally asymmetric with only one plane of symmetry or no plane of symmetry.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 37-43, 48-49, 77-78 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant claims (claim 37), the variable optical property mirror" having a reflecting surface that has a shape that defines only one plane of symmetry or no plane of symmetry; (claim 40), the "variable optical property mirror" having a reflecting surface that defines only one plane of symmetry or no plane of symmetry ;(claim 77) The "variable optical property element" having a rotationally asymmetric with only one plane of symmetry or no plane of symmetry. The specification showed a mirror, or variable used with an optical element that had asymmetric surfaces- but not the mirror or optical element itself. The use of the

language has raised the question of whether applicant is considering other parts of the system (other optical elements) part of the mirror or reflective type variable optical property element- rendering the scope indefinite, as there is no way to determine what prior art is applicable. For the case that applicant is using the terms loosely so as to consider a mirror or variable optical property reflective type optical element to contain the elements other than the mirror itself, rejections under Akyama is applied below, and for the case that applicant is using the language in a common fashion, the objection to new matter and 112 first paragraph rejection are applied.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 37-43, 48-49, 77-78 are rejected under 35 U.S.C. 102(b) as being anticipated by Akiyama et al 6522475.

The claims are written to:

37. A variable optical-property mirror unit comprising: a variable optical-property mirror comprising a rotationally asymmetric reflecting surface a length thereof along a first direction being different from a length thereof along a second direction; and a driving circuit constructed and arranged to drive said the variable

optical-property mirror wherein the variable optical-property mirror is arranged such that incident rays and emergent rays determine only one plane in which the incident rays and the emergent rays lie and that one of the first direction and the second direction coincides with a predetermined direction wherein the reflecting surface has a shape that defines only one plane of symmetry or no plane of symmetry. And wherein the predetermined direction is a direction of a cross line formed where the lane in which the incident rays and the emergent rays lie intersects the reflecting surface.

38. A variable optical-property mirror unit according to claim 37, wherein a shape of the reflecting surface of said variable optical-property mirror unit is variable.

39. A variable optical-property mirror unit according to claim 37, wherein the light deflection property of said reflecting surface is rotationally asymmetric.

40. An optical apparatus comprising: a variable optical-property mirror having a reflecting surface. a length thereof along a first direction being longer than either a length thereof along a second direction, and said wherein the variable optical-property mirror is arranged such that incident rays and emergent rays determine only one plane in which the incident rays and emergent rays lie and that the (long a first direction which coincides with a predetermined direction wherein the reflecting surface has a shape that defines only one plane of symmetry or no plane of symmetry and wherein the predetermined direction is a direction of a cross line formed where the plane which the incident rays and the emergent rays lie intersects the reflecting surface.

41. An optical device comprising a variable optical-property element; and an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said the variable optical-property element.

> 42. An optical device according to claim 41, further comprising an image sensor.
> 48. An optical device according to 41, wherein each of said variable optical-property mirror and an image sensor is disposed on a surface of said optical element with a plurality of rotationally asymmetric surfaces.

49. An optical system comprising: a variable optical-property mirror; and an optical element disposed at the front side or the back side of said the variable optical-property mirror wherein the optical element has a rotationally asymmetric surface having a shape that defines only one plane of symmetry or no plane of symmetry.

77. An optical apparatus, comprising an optical element; and a reflecting-type variable optical-property element wherein the reflecting-type variable optical-property element has a rotationally asymmetric surface and is arranged such that incident rays and emergent rays determine only one plane in which the incident rays and emergent rays lie and wherein the rotationally asymmetric surface has a shape that defines only one plane of symmetry or no plane of symmetry.

> 78. An optical apparatus according to claim 77, further comprising an image sensor.

This reference is variable, but would not typically be called a mirror, however has reflective surfaces where the incident light and reflected light are on a plane as claimed (all the surfaces through which the light travels). The reference has a variable optical property element (a zoom system) as below shown in the abstract "A zoom optical system comprises a plurality of optical elements. The plurality of optical elements include a first optical element having two refracting surfaces and a plurality of reflecting surfaces formed in a transparent body, being arranged such that a light beam enters an inside of the transparent body from one of the two refracting surfaces and, after being

successively reflected from the plurality of reflecting surfaces, exits from the other of the two refracting surfaces, and/or a second optical element having a plurality of surface mirrors integrally formed and decentered relative to one another, being arranged such that an incident light beam exits therefrom after being successively reflected from reflecting surfaces of the plurality of surface mirrors, and a third optical element composed of a plurality of coaxial refracting surfaces. In the zoom optical system, an image of an object is formed through the plurality of optical elements, and zooming is effected by varying relative positions of at least two optical elements of the plurality of optical elements". So the reflective surfaces are clearly not rotationally symmetric (many of the surfaces shown are immediately visible that they are not symmetric- such as , for example, surfaces R3, R5 and R7. And a plurality of non-rotationally symmetric surfaces are listed "after being successively reflected from the plurality of reflecting surfaces, exits from the other of the two refracting surfaces, and/or a second optical element having a plurality of surface mirrors integrally formed and decentered relative to one another, being arranged such that an incident light beam exits therefrom after being successively reflected from reflecting surfaces of the plurality of surface mirrors, and a third optical element composed of a plurality of coaxial refracting surfaces" . As the zoom system feeds the mirrors, they become a variable optical property mirror as a system. Also, please note, the "Of the plurality of reflecting surfaces, curved reflecting surfaces are all formed to anamorphic shapes", col. 6, last lines. The sensors are listed – CCD,

column 14. Many optical elements are present and can be construed as at the front or back. Therefore, these claims are anticipated by this reference.

Claims 37-43, 48-49, 77-78 are rejected under 35 U.S.C. 102(b) as being anticipated by Gelbart 6147789.

The claims are written to:

37. A variable optical-property mirror unit comprising: a variable optical-property mirror comprising a rotationally asymmetric reflecting surface a length thereof along a first direction being different from a length thereof along a second direction; and a driving circuit constructed and arranged to drive said the variable optical-property mirror wherein the variable optical-property mirror is arranged such that incident rays and emergent rays determine only one plane in which the incident rays and the emergent rays lie and that one of the first direction and the second direction coincides with a predetermined direction wherein the reflecting surface has a shape that defines only one plane of symmetry or no plane of symmetry. And wherein the predetermined direction is a direction of a cross line formed where the lane in which the incident rays and the emergent rays lie intersects the reflecting surface.

38. A variable optical-property mirror unit according to claim 37, wherein a shape of the reflecting surface of said variable optical-property mirror unit is variable.

39. A variable optical-property mirror unit according to claim 37, wherein the light deflection property of said reflecting surface is rotationally asymmetric.

40. An optical apparatus comprising: a variable optical-property mirror having a reflecting surface. a length thereof along a first direction being longer than either a length thereof along a second direction, and said wherein the variable optical-property mirror is arranged such that incident rays and emergent rays

determine only one plane in which the incident rays and emergent rays lie and that the (long a first direction which coincides with a predetermined direction wherein the reflecting surface has a shape that defines only one plane of symmetry or no plane of symmetry and wherein the predetermined direction is a direction of a cross line formed where the plane which the incident rays and the emergent rays lie intersects the reflecting surface.

41. An optical device comprising a variable optical-property element; and an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said the variable optical-property element.

42. An optical device according to claim 41, further comprising an image sensor.
48. An optical device according to 41, wherein each of said variable optical-property mirror and an image sensor is disposed on a surface of said optical element with a plurality of rotationally asymmetric surfaces.

49. An optical system comprising: a variable optical-property mirror; and an optical element disposed at the front side or the back side of said the variable optical-property mirror wherein the optical element has a rotationally asymmetric surface having a shape that defines only one plane of symmetry or no plane of symmetry.

77. An optical apparatus, comprising an optical element; and a reflecting-type variable optical-property element wherein the reflecting-type variable optical-property element has a rotationally asymmetric surface and is arranged such that incident rays and emergent rays determine only one plane in which the incident rays and emergent rays lie and wherein the rotationally asymmetric surface has a shape that defines only one plane of symmetry or no plane of symmetry.

78. An optical apparatus according to claim 77, further comprising an image sensor.

The reference, Gelbart clearly shows in figure 2 a rotationally asymmetrical surface (the sides from left to right are not symmetrical, as some of the reflective portions are depressed and others are not in an asymmetrical fashion. The lines of the incident and reflected light are shown in the same plane (also figure 2) and are also shown in other figures (figure 1a and b) as claimed. A sensor is shown as the light sensitive material 15. The reference further discloses "The invention uses an array of silicon nitride ribbons, micromachined on top of a silicon substrate using conventional integrated circuit fabrication technology. The ribbons can be deflected under an electrostatic force to form a cylindrical reflector. A thin metal coating, typically aluminum, is deposited on the surface or top of the ribbons for increased reflectivity. Since the required deflection of the ribbon in order to form an effective cylindrical mirror is quite small, the response time is fast and the voltage required to deform the ribbon is low. The high elastic modules of silicon nitride, combined with a very low coefficient of thermal expansion, allows the device to withstand very high incident powers, as encountered in thermal imaging and laser projection displays. The light valve can be used in "brightfield" or "darkfield" (Schlieren) mode. In summary, the invention uses the fabrication methods developed for grating light valves to build a deformable mirror light valve combining the fabrication and speed advantages of the former with the simplicity of the latter." and "3) A metal coating 2 which can be a highly reflective surface such as a metalized surface such as aluminum surface, on top of ribbon 1 serves both as an electrode and as a reflective layer. A second electrode 5 is deposited at the bottom of airspace 6.

Electrodes 2 and 5 form a capacitor. New by applying a voltage 10 between both electrodes, ribbon 1 is deformed due to the electrostatic attraction. The shape of the deformed ribbon can be approximated by a cylindrical surface. A hyperbolic cosine function would be a more accurate representation, but for deflection much smaller than the length of the ribbon the difference between the equations is not significant. ". Also note that the mirrors bend in only one direction, and are longer in one direction than another (see figure 2, element 1).

New light beam 7 is reflected by the coating 2. When the device is not energized most of the reflected light is blocked by stop 8. The stop 8 is a barrier that is not light transmissive. It may be considered as representing a non-transparent area. The narrow slit 9 being transparent area, in stop 8 allows only a small amount of light to go through when there is not energization of the capacitor made up of electrodes 2 and 5. These two elements, the non-transparent area 8 and the transparent area 9 comprise a combination of transparent and non-transparent areas for the change of focus of the incident light from light beam 7 into a change of intensity of the light. When the device is energized as shown in FIG. 1-b, the cylindrical shape of the ribbon resulting from the relative downward deflection of the mirror surface electrode 2 causes the reflected beam to come to a focus at the slit 9 formed in the barrier and most of the light can pass. It is obvious that if the position of the slit 9 and stop 8 are reversed the device can be used as well. In this case most of the light will pass beyond the stop in the non-energized state. These two modes of operation are sometimes referred to as "darkfield" and "brightfield" respectively. Many optical

elements are present and can be construed as at the front or back. Therefore, these claims are anticipated by this reference.

Claims 37-43, 48-49, 77-78 are rejected under 35 U.S.C. 102(b) as being anticipated by Zehnpfennig et al 5406412.

The claims are written to:

37. A variable optical-property mirror unit comprising: a variable optical-property mirror comprising a rotationally asymmetric reflecting surface a length thereof along a first direction being different from a length thereof along a second direction; and a driving circuit constructed and arranged to drive said the variable optical-property mirror wherein the variable optical-property mirror is arranged such that incident rays and emergent rays determine only one plane in which the incident rays and the emergent rays lie and that one of the first direction and the second direction coincides with a predetermined direction wherein the reflecting surface has a shape that defines only one plane of symmetry or no plane of symmetry. And wherein the predetermined direction is a direction of a cross line formed where the lane in which the incident rays and the emergent rays lie intersects the reflecting surface.

38. A variable optical-property mirror unit according to claim 37, wherein a shape of the reflecting surface of said variable optical-property mirror unit is variable.

39. A variable optical-property mirror unit according to claim 37, wherein the light deflection property of said reflecting surface is rotationally asymmetric.

40. An optical apparatus comprising: a variable optical-property mirror having a reflecting surface. a length thereof along a first direction being longer than either a length thereof along a second direction, and said wherein the variable optical-property mirror is arranged such that incident rays and emergent rays

determine only one plane in which the incident rays and emergent rays lie and that the (long a first direction which coincides with a predetermined direction wherein the reflecting surface has a shape that defines only one plane of symmetry or no plane of symmetry and wherein the predetermined direction is a direction of a cross line formed where the plane which the incident rays and the emergent rays lie intersects the reflecting surface.

41. An optical device comprising a variable optical-property element; and an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said the variable optical-property element.

42. An optical device according to claim 41, further comprising an image sensor.
48. An optical device according to 41, wherein each of said variable optical-property mirror and an image sensor is disposed on a surface of said optical element with a plurality of rotationally asymmetric surfaces.

49. An optical system comprising: a variable optical-property mirror; and an optical element disposed at the front side or the back side of said the variable optical-property mirror wherein the optical element has a rotationally asymmetric surface having a shape that defines only one plane of symmetry or no plane of symmetry.

77. An optical apparatus, comprising an optical element; and a reflecting-type variable optical-property element wherein the reflecting-type variable optical-property element has a rotationally asymmetric surface and is arranged such that incident rays and emergent rays determine only one plane in which the incident rays and emergent rays lie and wherein the rotationally asymmetric surface has a shape that defines only one plane of symmetry or no plane of symmetry.

78. An optical apparatus according to claim 77, further

comprising an image sensor.

Zehnpfennig et al discloses deformable mirror which is long and skinny (figure 12), and is a deformable mirror device. A wavefront correction requires that the shape not be limited by rotational symmetry, but must take on the shape required for arbitrary wavefront corrections. The incident light and reflected light are in a pline as claimed (see cover figure). Please note the language in the reference " The deformable wavefront correction mirror 18b, FIG. 12, may consist of a monolithic mirror which can be deformed by actuators 42b, acting typically by way of movable arms 236. The stationary ends of the actuators are anchored to rigid baseplate 36b. The actuators may typically be piezoelectric, electrostrictive, magnetostrictive, or of some other electro-mechanical form. Although thus far wavefront correction mirror 18b is depicted as a monolithic mirror, this is not a necessary limitation of the invention, for the mirror 18c, FIG. 13, may instead be formed of a plurality of smaller mirror elements 240, 242, 244, 246, each of which corresponds to an area approximately three inches square in the entrance pupil, and is supported on typically three actuators 42b on rigid baseplate or beam 36b.". Also note that drive circuits and detectors are shown (cover figure), and present in the following language "here is shown in FIG. 1 a high-resolution synthetic aperture telescope 10 including primary mirror 12 which is formed in the shape of a diametrically centered chordal section of the aperture to be synthesized. Primary mirror 12 may be made of beryllium, aluminum, glass, Pyrex or other conventional materials, and coated with protected aluminum, gold if operation is in infrared range, or any other suitable

optical coating. An opening 14 is provided centrally of primary mirror 12 so that incoming light depicted by rays 16 reflected from secondary mirror 18 can pass through to detector assembly 20, which may for example be a CCD array. The telescope rotates about optical axis A-A' in order to produce the set of component images, each corresponding to a separate angular orientation, needed to reconstruct the final image." and elescope system 10 is driven by telescope rotation drive 60, FIG. 4,

operated by controller 62 to rotate smoothly and continuously or in steps, as desired. The position of mirror 12 is sensed by the telescope rotation synch signal circuit 64 which provides a synch signal to memory 66. Memory 66 also stores the input from detector array 20 which has been passed through amplifier 68 and A/D converter 70. From memory 66 each of the component images is delivered to a preprocessing circuit 72, either directly or through a remote data link. The preprocessing circuit for example corrects for the difference in sensitivity between the individual elements or pixels of the detector array 20. Following this a Fourier transform of the component image is generated in Fourier transform circuit 74. A weighting function is applied in weighting circuit 76 to adjust the low spatial frequency data in each component image, after which each of the component images so weighted are co-added together in adder 78 to form a composite Fourier transform. The inverse Fourier transform is then generated in circuit 80 to provide the final high-resolution image of the object as if produced by the full, diffraction limited aperture being synthesized. The output may then be fed to any desired storage or display

device such as memory 82, a telemetric output 84, or a local or remote display 86.". Many optical elements are present and can be construed as at the front or back. Therefore, these claims are anticipated by this reference.

Election/Restrictions

Applicant's election with traverse of group I in the reply filed is acknowledged. The traversal is on the ground(s) that 38-39 were not listed as part of the group I. This is not found persuasive because 38-39 are part of the elected group I and have been examined therewith.

The requirement is still deemed proper and is therefore made FINAL.

Response to Arguments

Applicant argues that the references lack the claimed limitations, however, the references show the limitations in the sense that the application itself shows the limitations, and in the sense that some of the references show deformable mirrors, some states of which would meet the claimed limitations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth A Parker whose telephone number is 571-272-2298. The examiner can normally be reached on M-F 10:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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